FOREIGN TRIP REPORT

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I. Junta de Energia Nuclear, Madrid, Spain

A visit was made to Madrid, Spain from 1 to 7 December, 1975. This trip was made to complete an effort begun in September of this year. At that time a re-calibration of the in-vivo plutonium detection system was begun but not completed due to the late arrival of some calibration standards. Additional standards were carried to Madrid on this trip and a complete calibration of the counting system was made. The equipment performed as expected and the Spanish now have as good a detection system as exists in the United States. This part of their operation is now well in hand and no further complications are forseen.

Dr. Emilio Iranzo, head of the Division of Medicine and Protection, again impressed upon me his desire to establish a more formal working relationship with an ERDA laboratory, preferably the Lawrence Livermore Laboratory, with myself as prime contact. He feels that it is necessary for the JEN to have a reliable source of information and advice and a formal contact with ERDA. In the past when he has needed information or to discuss a problem he hasn't known for certain whom he should approach. He has had several contacts but all informal. No one person has been defined to him as

his contact. The Spanish attach much importance to formality and in this case in particular I feel it is very important.

In view of the above a meeting was arranged with the following attendees: General Jesus Olivares Baque, President of the Junta; Francisco Pascual Martin, General Director; Dr. Emilio Iranzo Gonzalez and Dr. Francisco de los Santos Salinas, Division of Medicine and Protection; myself. The purpose of the meeting was to discuss possible mechanisms to improve coordination of efforts between the JEN and ERDA. General Olivares and Mr. Pascual both repeated the feeling of Dr. Iranzo that a more formal working arrangement must be established. They stated that the JEN would be very pleased to have such an arrangement with the LLL if this was acceptable to ERDA and this Laboratory. I had stated that it was our intention to form a Committee of three persons to provide ERDA headquarters with advice and direction for its efforts in Project Indola. General Olivares stated that the JEN would probably do the same. Before they take any action, however, they would like a letter from ERDA Headquarters (Dr. Liverman) stating that these arrangements are acceptable. They would then write to Dr. Liverman stating the arrangements they would make. They would, for example, be willing to provide an annual report on progress made during the year and a plan of operation for the following year, including a budget.

I strongly advise the acceptance of these arrangements. We are proposing a modification of an existing 189 to cover the effort to be expended at LLL. The ERDA Committee members would be Martin Minthorn of ERDA, Chester Richmond of ORNL, and Phillip Dean of LLL.

II. International Atomic Energy Agency, Vienna, Austria.

A trip was made to Vienna, Austria on 7 to 12 December, 1975 to attend the International Seminar on Diagnosis and Treatment of Incorporated Radionuclides, and to present a paper titled "Design Criteria for Phantoms for Calibration of External Detectors for the In-Vivo Detection of Plutonium." This seminar was arranged to include all radionuclides but was devoted primarily to the transuranics, particularly plutonium. Twenty-eight countries were represented by 110 delegates with the largest delegations coming from France, Federal Republic of Germany, United Kingdom, and United States. There were eight sessions covering four general areas.

A. A review was presented of the current ICRP Committee II findings and recommendations on the metabolic excretion and retention patterns of incorporated radionuclides in reference man. A report, ICRP-23, has recently been published presenting standard man criteria and data. Committee II will shortly publish a new report replacing the 1959 one. It will present the latest metabolic data and include methods of summing risks when more than one critical organ is being exposed simultaneously. It will also include excretion equations for each isotope and organ and present methods of computing retention. This will be of great value to our health physics program.

Some long term retention data on plutonium in man was presented which indicated that the Langham equation, used to relate excretion to total body burden, did not adequately describe the data at long times after exposure (10,000 days). Some modification of this equation was recommended. Other data was presented on the incorporation of some radiosotopes (mostly cesium and cobalt) through injured skin, primarily by burns, showing that the uptake of the

isotopes is enhanced in the first three hours after injury. The importance of rapid treatment of such injuries was emphasized.

B. One day (two sessions) was devoted to a discussion of detection methods. Eight papers dealt with the difficulties of detecting plutonium in-vivo. Both the electronics and calibration methods were discussed. In essence there have been no new breakthroughs in chest counting detector development recently, only a better awareness of the limitations of current methods. Interaction between delegates from many countries was extensive and very beneficial in bringing out new ideas. A new and novel method of detecting plutonium in wounds was described. It utilizes a small (3mm dia.) NaI(Tl) crystal on the end of a plastic rod to probe into the wound itself. Although quite direction sensitive it could be of very good use in locating pieces of metallic plutonium or contaminated materials such as pipette fragments in a wound, making it much easier to remove them without excising relatively large amounts of tissue. This technique should be investigated within the United States.

C. Three sessions were devoted to methods of removal of incorporated radionuclides, both in animals and in man. Seven papers were presented summarizing data obtained from animal experiments with plutonium. Two forms of DTPA chelation therapy were described. The usual form, Ca-DTPA, is well understood, being in routine use at many laboratories both in the United States and in Europe. One reservation in its use has always been a concern over its toxicity. It is known that large continuous doses, which would be ideal from a treatment standpoint, are very toxic and have even been lethal in rats. Experiments in Germany were described that utilize a new form,

Zn-DTPA, which exhibits no such toxicity. It is very promising and several U. S. delegates expressed a desire to obtain the chemical, which should be available commercially early next year. There was a lot of debate over the relative merits of i. v. injection vs inhalation of DTPA. For a lung exposure of soluble forms of plutonium, inhalation is the preferred method. The general consensus seems to be that i. v. injection is otherwise preferred since it gets the DTPA into the blood stream as quickly as possible. Two papers were presented on the use of pulmonary lavage to remove inhaled insoluble forms of plutonium. This technique can be most usefull if implemented within a few days of exposure. At longer times it is not very effective and does carry some risk.

D. The final session was devoted to medical first-aid treatment. A procedure for immediate first-aid treatment for internal exposure to radionuclides was described by a group from France. It utilizes first-aid kits which may be used by the individual who is affected. Included in the kit are materials and specific instructions for a large number of isotopes. For cases where the aid of a physician is required there is a medical pack. The use of this system requires blind treatment under an assumption of high internal contamination. Such treatment did not receive very favorable comment from the audience. Finally the REAC/TS system of Oak Ridge Associated Universities was described. This is a pragmatic approach for providing physician education for radiation emergencies requiring decontamination and medical care. It is meant primarily to train surgeons in how to react in radiation emergencies. Regular training sessions are scheduled and participation by all regions of the country is invited.

In summary I found this Seminar to be very beneficial to me both in providing a medium for interaction with many delegates from other countries, who have different approaches to similar problems and who would not otherwise be available to me, and in being brought up to date on the latest information in areas slightly peripheral to my own but necessary for a complete understanding of the overall field. I strongly recommend continued United States participation in such seminars.